DOCUMENT RESUME

ED 289 506 IR 012 973

AUTHOR	Ellington, Henry
TITLE	Essay-Type Questions. Teaching and Learning in Higher Education, 23.
INSTITUTION	Scottish Central Institutions Committee for Educational Development.
SPONS AGENCY	Robert Gordon's Inst. of Technology, Aberdeen (Scotland).
PUB DATE	87
NOTE	15p.; For a related guide, see IR 012 970.
PUB TYPE	Guides - Non-Classroom Use (055) -- Information Analyses (070)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Essay Tests; Foreign Countries; Higher Education; Instructional Material Evaluation; *Questioning Techniques; Scoring; *Test Construction; *Test Format; *Test Items

ABSTRACT

The third of three sequels to the booklet "Student Assessment," this booklet begins by describing and giving examples of three forms that essay-type questions can take: (1) unstructured-essay questions; (2) structured-essay questions; and (3) short-notes questions. Guidelines are then provided for deciding which type of question to use in a given situation and basic rules for writing essay-type questions are presented. Practical advice on how to evaluate and mark essay-type questions concludes the booklet. An annotated list of three items recommended for further reading is included. (MES)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Henry Ellington

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

This booklet was first published internally in Robert Gordon's Institute of Technology, Aberdeen as part of the Institute's staff development programme. It was written by Dr Henry Ellington of RGIT's Educational Technology Unit.

CICED gratefully acknowledges the co-operation of RGIT and the author in the publication of the present edition of the booklet.

© CICED 1987

Essay-type Questions

Introduction

This booklet forms a sequel to the booklet on 'Student assessment', which presents a broad survey of the field and examines the different assessment techniques that can be employed therein. The present booklet deals in more detail with one particular group of assessment instruments, namely, extended questions of the *essay* type.

The booklet begins by examining the different forms that essay-type questions can take and offering guidance on how to decide which type to use in a given situation. Next, it gives detailed guidance on how to write essay questions of different types. Finally, it offers practical advice on how to evaluate and mark essay-type questions.

The different forms of essay-type questions

As was indicated in the booklet on 'Student assessment', 'extended-writing' questions of the essay type are still one of the most widely used forms of assessment question despite their numerous weaknesses and limitations (doubtful validity, low reliability, etc.). Let us therefore begin by taking a look at the various forms that such questions can take.

Unstructured-essay questions

These are essay questions which are worded in such a way as to give the writer the maximum possible freedom to determine the nature and scope of his response – subject, of course, to the intrinsic constraints imposed by the subject matter, the available time, etc. They are also known as *extended-response questions* or *free-response questions*. Three typical examples are given below.

Example 1

'Write an essay of roughly 3 pages on the character of Hamlet'.

Example 2

'Do practising scientists really employ a "scientific method", or is the term simply a figment of the imagination of philosophers? Discuss in roughly 1200–1500 words.'

Example 3

'Select any social or ethical issue involving science or technology, state your personal position regarding this issue, and present a reasoned argument of roughly 1000 words justifying same'.

Structured-essay questions

These questions (which are also known as *restricted-response questions*) differ from unstructured-essay questions in that they give the testee far less freedom to determine the nature and scope of the response. Indeed, they are deliberately worded in such a way as to give the testee a considerable amount of guidance as to what the structure and content of the essay should be. Three typical examples are again given below.

Example 1 (a straightforward structured-essay question)

'Write an essay of between three and five pages on the biological effects of ionising radiation, dealing first with the general effects of radiation on living tissue, then with the specific effects on human beings (at both "whole body" and "individual organ" level), and finally with the possible long-term genetic effects on the human race'.

Example 2 (a structured-essay question involving presentation of standard theory)

'Explain why a very heavy nucleus can move to a more stable configuration by undergoing nuclear fission and use the semi-empirical mass formula to derive an expression for the amount of energy that is released by the symmetric fission of such a nucleus. (5)
Explain why the value of the energy release that is obtained using this expression is always smaller than might be expected. (2)
With the aid of a clearly-labelled diagram, explain how the potential barrier that opposes spontaneous nuclear fission arises. Discuss the factors that determine whether or not a given nucleus is basically stable against spontaneous fission. Explain what is meant by the "fissionability parameter" of a nucleus, and derive the criterion for stability. (11)
Briefly explain why a nucleus that is basically stable against spontaneous fission can have a finite probability of undergoing such fission.' (2)

Example 3 (a structured-essay question of the 'problem' type)

'A space vehicle is moving round the Earth in a circular orbit of radius 15,000 km and is to be transferred to a coplanar circular orbit of radius 30,000 km. With the aid of a clearly-labelled diagram, describe the process by which this transfer can be brought about with the minimum expenditure of fuel. (6)
Assuming that the mass of the vehicle does not change significantly during the motor burns needed to bring about the above manoeuvre, find the values of the velocity changes needed to execute the

manoeuvre, explaining the origins of any formulae that you use. (14)

Constant of universal gravitation = 6.67×10^{-11} $Nm^2 kg^{-2}$
Mass of Earth = 5.98×10^{24} kg '

Short-notes questions

These are questions where the answer is shorter than for a full essay question but longer than for an 'open' short-answer question. Such questions can take a wide range of forms, and can be incorporated in tests and examinations of all types. Two typical examples are given below.

Example 1 (a short-notes question of the type that might be incorporated in a conventional 'answer any x from y'-type essay paper as one of the options).

'Select FOUR of the following topics, and, in each case, explain what the effect or phenomenon is and give a physical explanation of how it arises.

(a) Thomson effect
(b) Peltier effect
(c) Meissner effect
(d) ferroelectricity
(e) piezoelectric effect
(f) magnetostriction (5 marks each)

Example 2 (a short-notes question of the type that might be incorporated in a paper consisting of a series of such questions, or of a mixture of short-answer and short-notes questions.)

'With the aid of a clearly-labelled diagram, describe the electronic band structure of diamond and explain why it is an electrical insulator.' (4 marks)

Deciding which type of question to use in a given situation

As was suggested in the booklet on 'Student assessment', essay questions are best suited for testing a student's powers of *synthesis* and *evaluation* – the top two levels of the *cognitive domain*, although they are also frequently used to assess learning outcomes and skills that lie lower down the cognitive domain. As we have seen, these lower-level cognitive areas (*knowledge*, *comprehension*, *application* and *analysis*) are far more suited to assessment using questions of the *multiple-choice* or *short-answer* type. Essay questions are, of course, also highly suitable for testing a student's written

communication skills, and are often used as a vehicle for doing just this.

Thus, anyone who is thinking of using essay-type questions as the basis of a student assessment scheme should first ask himself whether this type of question is really the most suitable for what he has in mind. In other words, he should ask whether the main learning outcomes that he is trying to assess lie in the higher cognitive areas of synthesis and evaluation or are specifically concerned with written communication skills. If they do not, then he should seriously think of employing some other, more suitable, form of assessment vehicle (see the booklet on 'Student assessment' for a review of the various techniques that are available).

Having said this, however, it is appreciated that a person setting a test or examination is often expected to write this in the form of a traditional 'answer any x from y' essay test, regardless of whether the extended essay question is in fact the most suitable vehicle for the assessment in question. If this is so, the designer of the test or examination should at least try to match the styles of the questions to the specific learning outcomes and skills that it is wished to test, in so far as this is possible. Thus, if the outcomes being tested lie mainly in the lower-to-middle region of the cognitive domain (i.e. are mainly related to *knowledge*, *comprehension*, *application* or *analysis*), he should restrict himself to *structured-essay questions* or *short-notes questions*, which, although not ideally suited for testing in these areas, can be used to do so fairly effectively if properly designed. *Unstructured-essay questions*, on the other hand, should *only* be used if the outcomes being tested fall in the areas listed in the last paragraph, i.e. are mainly concerned with *synthesis* or *evaluation*, or with *written communication skills*. Indeed, the most suitable role for such essay questions is probably in course work or continuous assessment rather than in formal examinations, since it is generally only in such contexts that students really have time to do full justice to this most demanding of assessment vehicles.

How to write essay-type questions

The construction of clear, unambiguous essay questions that effectively assess what they are intended to assess is a much more difficult task than is commonly supposed. As with other types of questions, however, the observance of a number of basic rules can help to make the task somewhat easier. Some of the more important of these are given below.

1. *Match the question to the specific outcomes being assessed*

As we saw in the previous section, it is important to choose the correct style of essay question in any particular situation. It is also important to design the question in such a way that it assesses those particular learning outcomes or skills in which you are interested. Thus, as in the case of multiple-choice or short-answer questions, the best way to start is with a precise specification of the behaviour that is to be measured. This will help you to determine both the *content* and the *form* of the question, and should also be of considerable assistance in deciding how to express it.

2. *Formulate the question so that the student is presented with a clearly-defined task (or series of tasks) and knows exactly what is expected of him/her.*

This is again absolutely fundamental – not only for highly explicit structured-essay and short-notes questions but also for questions of the free-response type. In the case of the former, it is generally possible to define the task completely in the wording of the actual question (see, for example, the various examples given on pages 2 and 3.) With unstructured essay questions, on the other hand, this is much more difficult to do without defeating the whole object of the exercise by tying the writer down to a rigid pattern and limiting his freedom to select, organise and present the material that *he or she* feels to be appropriate. One way round this problem is to indicate to the students the criteria that are to be used in marking the essay, e.g. by including a statement of the following type.

'The following factors will be taken into account when marking this essay (or the various questions in this paper):

- the extent to which the topic is fully covered;
- the relevance and appropriateness of the material that is included;
- the extent to which arguments are well presented and supported;
- the skill with which the material is organised and structured.'

In the case of unstructured essays that are set as part of course work or continuous assessment, it may sometimes be appropriate to be even more specific with regard to what is being looked for – particularly if the essay is being used as a vehicle for helping the students to develop written communication skills. Indeed, it may well be appropriate in such cases to tell the students that a certain proportion of the marks will be

awarded on the basis of the 'craft skills' that they demonstrate, and to provide a detailed explanation of what exactly is being looked for in respect of same. An example of a set of guidelines of this type is given below.

'The craft skills being looked for in the essays'

In order to gain a high 'craft skills' mark, an essay should have the following characteristics.

(a) It should have a logical and clearly-defined *structure*, as evidenced by division into sections and use of section headings.

(b) It should be sound in respect of *grammar*, *punctuation*, *spelling* and *style*.

(c) It should include an *Introduction* that clearly states:
   (i) how you have chosen to interpret the question under discussion;
   (ii) how you intend to tackle the question in the essay.

(d) The main body of the essay should consist of clear, thorough and (wherever possible) *substantiated* arguments; references should be indicated in the text by giving the *author* and *date* – e.g. (Jones, 1983);

(e) It should include a *Conclusion* that summarises and/or draws together the main points.

(f) It should include a *References* section that lists the sources of material cited in the text. Each reference should contain the following information:
   (i) Books*: author*; *date*; *title*; *publisher*; *page no(s)*.
   (ii) Articles, papers, etc*; author, date; title*; *name of journal or book in which it appears* (including volume and issue numbers in the case of a journal, or name of editor or compiler and publisher in the case of a book); page no(s).

(g) It should include a *Bibliography* section that shows evidence of background reading in connection with the essay. This should take the same form as the *Reference* section, except that page numbers need not be included.'

The students should, of course, also be given some indication of the *length* of the essay that they are expected to produce.

3. *Express the question in clear, simple, unambiguous language*

This is just as important in the case of essay-type questions as it is with multiple-choice and short-answer questions. Thus, words should be chosen with extreme care, and the question phrased in such a way that the student does not have to waste time trying to work out exactly what it means. Remember that a good assessment item should test the student's knowledge of the material on which the question is set, *not* his ability to interpret the question. Also, try not to set questions that can be answered with a single word or short phrase, e.g.: 'Do you think that uncontrolled wage bargaining is the most important cause of inflation?' (possible answers: 'yes' or 'no')
or
'What do you know about Einstein's General Theory of Relativity?' (possible answer: '. . . . . all!').

4. *Provide appropriate supplementary information*

If a question involves the use of data, physical constants, formulae etc. which the student is *not* expected to know from memory, make sure that everything needed is provided – either as part of the question or at the start of the paper.

If a question involves calculations, tell the student what degree of accuracy is expected, whether working has to be shown, whether any assumed formulae or equations have to be stated or explained, etc.

5. *Provide a mark breakdown where this is appropriate*

In the case of structured questions, the student often has no idea of just how much he is expected to write on each component of the question. Such confusion can generally be minimised by providing a detailed mark breakdown alongside the different parts of the question (as in the question on nuclear fission on page 2). Such a breakdown is, of course, seldom possible (or appropriate) in the case of unstructured essay questions, except in cases where marks are awarded on the basis of different criteria (e.g. x% for content; y% for craft skills).

How to evaluate essay-type questions

As in the case of objective and short-answer questions, it is always a good idea to have essay questions evaluated in some way *before* they are set to students. Since essay questions do not lend themselves to the sort of objective, quantitative evaluation that can be applied to the former, however, the only effective way in which

this can be done in practice is to have the questions carefully vetted by a colleague or validation panel.

An essay question should be prepared for such evaluation in much the same way as a multiple-choice or short-answer question, preferably by presenting it on a standard pro-forma of some sort. This should not only show the full text of the question, together with any ancillary instructions, data, or material, but should also state:

- the course, module, syllabus, etc. that the question relates to;
- the purpose for which the question is to be used;
- the particular topic (or group of topics) that the question re lates to;
- the particular educational skills or outcomes that the item is designed to assess.

It should also state the name of the originator of the item and the date of production.

It is also important to provide the person or group that is to carry out the evaluation with a clear idea of the sort of answer that is expected. In the case of a structured-essay or short-notes question, this can either be done by providing a list of the key points that the answer should cover, together with the marks to be awarded for each, or by preparing a complete model answer, again with an associated mark breakdown scheme. In the case of an unstructured essay, on the other hand, preparation of either of these forms of marking guide is seldom possible, so the best way to proceed is probably to draw up a list of the criteria with respect to which the essay is to be marked – preferably with a guide to the weighting that is to be associated with each.

Ideally, the colleagues or validation panel carrying out the evaluation should also be provided with an appropriate pro-forma on which to note their conclusions. This should ask for the following information about the question:

- Is the question relevant to the course/module/syllabus to which it relates?
- Is the question style appropriate to the topic being covered and the specific educational skills or outcomes being assessed?
- Does the question provide the testees with a clearly-defined task?
- Is the question logically and structurally sound?
- Is the question stated in clear, simple language?

- Is the question of a suitable level of difficulty? length?
- Is the proposed marking scheme appropriate? fair?

Obviously, any weaknesses or deficiencies identified by the evaluation process should be remedied *before* the question is put to use – after being subjected to further evaluation, if necessary.

If it is a complete examination or test paper that is being evaluated, a number of further questions should be asked:

- Does the paper provide adequate coverage of the syllabus/module/course in respect of which it has been set?
- If the paper allows the students a choice of questions,
  (a) are the questions of comparable difficulty and length?
  (b) have steps been taken to ensure that every student answers questions on a suitably wide range of topics or areas?

How to mark essay-type questions

As was indicated in the booklet on 'Student assessment', one of the major limitations of essay tests is the inevitable high degree of subjectivity associated with the marking – something that can greatly reduce their reliability. Even with the best will in the world, for example, the marker may find it difficult to exclude from his judgement such things as:

- his personal feelings towards the writer of the essay (favourable or unfavourable);
- his own personal opinions (or prejudices!) regarding the topics being discussed or the arguments or views being presented;
- extraneous factors not related to the intrinsic worth of the content (untidy presentation, writing that is difficult to read, poor spelling, bad grammar etc.)

Thus, when marking essay questions, a supreme effort should be made to do so in as objective a manner as possible. Observing the following general guidelines should help to make this easier.

1. *Always mark essay questions in terms of the specific learning outcomes being measured*

   As we saw earlier, essay questions should always be set with specific educational skills or outcomes in mind. Thus, when marking such questions, these outcomes should be used as the sole (or main) criteria on which the marking is based. If a question is designed simply to measure the student's ability to

explain a particular cause–effect relationship, for example, the answer should be evaluated in terms of just how adequately it does just that. *All* other factors, such as interesting but irrelevant factual information, style, spelling, grammar, legibility and neatness should (in so far as this is possible or appropriate) be ignored during the evaluation. It may well be, of course, that a certain proportion of the marks are awarded for some of these other factors, but they should still not be allowed to influence the mark that is awarded in respect of the central criterion.

2. *Always mark structured–essay or short–notes questions by some sort of 'point method'*

   As we saw in the previous section, a list of the key points to be covered, or a model answer, should generally be produced in association with a question of the structured–essay or short–notes type – as a guide for the person carrying out the evaluation of the question. Needless to say, such a list or model answer should also be used as a guide during the marking of the question, with marks being awarded strictly in accordance with the scheme that is incorporated therein. By adopting such a procedure, it is generally possible to mark structured–essay or short–notes questions with a fairly high degree of objectivity – and hence a high degree of reliability – provided, of course, that proper care has been taken in the design of both the question and the marking scheme.

3. *Always employ clearly–defined criteria when marking unstructured essay questions*

   As we saw earlier, unstructured essay questions are intrinsically unsuited to a 'point method' of marking of the type that can be used with highly structured or prescriptive questions. Thus, the only way in which such questions can be marked with any degree of objectivity is to base the marking on a suitable set of criteria of which the students writing the essays have been made fully aware. Even when this is done, a considerable degree of subjectivity will almost certainly remain, but, by choosing the criteria with care and then rigidly adhering to them during the marking process, this can be kept to a minimum.

   Because of the difficulty associated with assigning meaningful numerical marks to unstructured essays, a less discriminating marking scheme based on the use of *grades* rather than marks is often employed. One of the most widely used systems of this type is the A, B, C, D, E scale, which typically awards an 'A' for an essay of First Class Honours standard, 'B' for an essay of "Upper Second" standard, 'C' for "Lower Second",

and so on. When marking to such a scale, it is often a good idea to read the essays more than once, using the first reading to arrange them in rough rank order and the second reading to refine the ranking and assign the final grades. An alternative method is to award a separate mark or grade in respect of each of the criteria being used to evaluate the essay and then base the final overall grade on these.

4. *Always mark essay tests 'question by question' rather than 'student by student'*

Scoring or grading essay tests by marking *all* the responses to a given question before proceeding to the next helps to make it possible to maintain a uniform standard in carrying out this marking. This procedure also helps to reduce the *halo effect* in marking (the process whereby the mark awarded to a particular student in respect of a given question is influenced by the general impression of that student gained from marking other questions). The halo effect can be further reduced by marking the questions 'annonymously' in so far as this is possible, e.g. by making a conscious effort not to notice the name on the front of the response book when marking a particular question. This, of course, can be difficult, or even impossible – particularly in cases where the marker is thoroughly familiar with the handwriting, styles, etc. of the individual students.

5. *If possible, have essay questions marked by more than one person*

By far the best way to check on the reliability of the marking of essay questions (particularly unstructured essays) is to obtain two or more independent judgements. While this may simply not be feasible for all routine classroom testing, it should be done from time to time just as a check. Obtaining two or more independent ratings is, of course, particularly vital in situations where the results are to be used for making important or irreversible decisions, such as the selection of students for further training or study (e.g. admission to the honours year of a course) or for the award of honours, gradings or prizes. Here, the pooled ratings of several competent persons may be needed to attain a level of reliability that is commensurate with the significance of the decision being made.

Further Reading

1. *Constructing Achievement Tests*, by N E Gronlund; Prentice Hall Inc., Englewood Cliffs, New Jersey; 1968 (An extremely useful source of guidance on all forms of assessment, including essay questions.)
2. *Fundamentals of Measurement*, by N M Downie; Oxford University Press; 1967 (Another useful book that deals with essay tests in some detail.)
3. *Test Construction*, by D A Wood; Columbus, Ohio; 1960 (A third general book on assessment that contains useful material on the design of essay questions and essay tests.)